```
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465             470             475                         480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485             490             495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500             505             510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515             520             525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530             535             540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545             550             555                         560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            565             570             575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580             585             590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        595             600             605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610             615             620


<210> 472
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 341 407 420 GCC GCC GCC

<400> 472
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5               10              15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20              25              30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35              40              45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50              55              60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65              70              75              80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
            85              90              95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100             105             110
Thr Thr Gly Lys Ala Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115             120             125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130             135             140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145             150             155             160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165             170                 175
Val Asp Gln Lys Cys Lys Ala Ser Ala Gln Ile Asp Pro Thr Pro Val
        180             185             190
Ile Val Thr Ala Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
    195             200             205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210             215             220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225             230             235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245             250             255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260             265             270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
    275             280             285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
```

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            290                    295                    300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                 310                 315                    320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325                 330                    335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340                 345                    350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            355                 360                    365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        370                 375                    380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                 390                    395


<210> 473
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 341 407 420 GCC GCC GCC

<400> 473
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
            35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
        50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Ala Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
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```
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                     360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
        370             375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                     390                 395                 400
Val Asp Gln Lys Cys Lys Ala Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ala Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465             470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485                 490                 495          .
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
        530                 535


<210> 474
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 341 407 420 GCC GCC GCC

<400> 474
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Ala Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ala Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ala Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
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Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275   280   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290   295   300
Arg Leu Ala Arg Gly His Ser Leu
305   310

<210> 475
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 54 228 GCC GCC

<400> 475
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1   5   10   15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20   25   30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35   40   45
Glu Gln Ala Pro Leu Ala Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50   55   60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65   70   75   80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85   90   95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100   105   110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115   120   125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130   135   140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145   150   155   160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165   170   175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180   185   190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195   200   205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210   215   220
Met Glu Leu Ala Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225   230   235   240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245   250   255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260   265   270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275   280   285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290   295   300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305   310   315   320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325   330   335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340   345   350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355   360   365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370   375   380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385   390   395   400

```
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405             410             415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420             425             430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435             440             445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
        450             455             460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465             470             475             480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485             490             495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500             505             510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            515             520             525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
        530             535             540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545             550             555             560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565             570             575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580             585             590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        595             600             605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610             615             620


<210> 476
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 54 228 GCC GCC

<400> 476
Met Glu Leu Ala Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5               10              15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20              25              30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35              40              45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50              55              60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65              70              75              80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85              90              95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100             105             110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115             120             125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130             135             140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145             150             155             160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165             170             175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180             185             190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            195             200             205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210             215             220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
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```
                225                   230                   235                   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                    245                   250                   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                260                   265                   270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
                275                   280                   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
                290                   295                   300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                   310                   315                   320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325                   330                   335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                340                   345                   350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
                355                   360                   365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
                370                   375                   380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                   390                   395


<210> 477
<211> 536
<212> PRT      .
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 54 228 GCC GCC

<400> 477
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
                20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
                35                  40                  45
Glu Gln Ala Pro Leu Ala Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
            50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                    85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
                100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
                115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
                130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
                180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
                195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
            210                 215                 220
Met Glu Leu Ala Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
                260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
                275                 280                 285
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Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
    530                 535


<210> 478
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 54 228 GCC GCC

<400> 478
Met Glu Leu Ala Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1                 5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
```

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Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
210   215   220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225   230   235   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
245   250   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
260   265   270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
275   280   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
290   295   300
Arg Leu Ala Arg Gly His Ser Leu
305   310

<210> 479
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 96 125 511 GCA GCG GCA

<400> 479
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1   5   10   15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
20   25   30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
35   40   45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
50   55   60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65   70   75   80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Ala
85   90   95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
100   105   110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Ala Pro Thr Leu
115   120   125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
130   135   140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145   150   155   160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
165   170   175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
180   185   190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
195   200   205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
210   215   220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225   230   235   240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
245   250   255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
260   265   270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
275   280   285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
290   295   300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305   310   315   320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
325   330   335

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```
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
        370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                     400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                     480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ala Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                 535                 540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                 550                 555                     560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            565                 570                 575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                 585                 590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    595                 600                 605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610                 615                 620

<210> 480
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 96 125 511 GCA GCG GCA

<400> 480
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
  1               5                  10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                      80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
            85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                     160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
```

```
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                     185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            195                     200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                     215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                     230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245                     250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                     265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ala Val
    275                     280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                     295                 300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                     310                 315                 320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
            325                     330                 335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340                     345                 350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            355                     360                 365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370                     375                 380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                     390                 395
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<210> 481
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 96 125 511 GCA GCG GCA

<400> 481
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Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1                 5                 10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
            35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Ala
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Ala Pro Thr Leu
    115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
    195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
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Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
        290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ala Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
530                 535
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<210> 482
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 96 125 511 GCA GCG GCA

<400> 482
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Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
```

```
         130                    135                   140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                    150                   155                   160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                   165                   170                   175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                180                   185                   190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
             195                   200                   205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
         210                   215                   220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                   230                   235                   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                   250                   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
             260                   265                   270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ala Val
             275                   280                   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
         290                   295                   300
Arg Leu Ala Arg Gly His Ser Leu
305                   310


<210> 483
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 54 163 GCC GCT

<400> 483
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1                 5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
             20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
         35                  40                  45
Glu Gln Ala Pro Leu Ala Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
     50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
             100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
         115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
         130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Ala Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
             180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
         195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
         210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
             260                 265                 270
```

Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
     275   280   285

Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
   290   295   300

Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305   310   315   320

Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
         325   330   335

Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
         340   345   350

Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
         355   360   365

Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
   370   375   380

Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385   390   395   400

Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
         405   410   415

Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
         420   425   430

Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
         435   440   445

Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
   450   455   460

Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465   470   475   480

Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
         485   490   495

Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
         500   505   510

Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
         515   520   525

Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
   530   535   540

Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545   550   555   560

Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
         565   570   575

Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
         580   585   590

Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
         595   600   605

Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
   610   615   620

<210> 484
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 54 163 GCC GCT

<400> 484
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1   5   10   15

Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
         20   25   30

Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
         35   40   45

Glu Gln Ala Pro Leu Ala Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
   50   55   60

Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65   70   75   80

Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
         85   90   95

Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile

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              100                    105                  110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
         115                120                125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
     130                135                140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                150                '  155                160
Thr Gln Ala Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
              165                170                175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
         180                185                190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
         195                200                205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
     210                215                220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                230                235                240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
              245                250                255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
              260                265                270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
         275                280                285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
     290                295                300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                310                315                320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
              325                330                335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
              340                345                350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
         355                360                365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
     370                375                380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                390                395                400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
              405                410                415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
              420                425                430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
         435                440                445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
     450                455                460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                470                475                480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
              485                490                495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
         500                505                510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
     515                520                525
Arg Leu Ala Arg Gly His Ser Leu
     530                535
```

<210> 485
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 197 420 GCG GCC

<400> 485

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Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1               5                  10                  15
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Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
         20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
         35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
             85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ala Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ala Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                 535                 540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
```

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Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                     565   570   575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
             580   585   590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
         595   600   605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610   615   620

<210> 486
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 197 420 GCG GCC

<400> 486
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1   5   10   15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
             20   25   30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
         35   40   45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50   55   60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65   70   75   80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
             85   90   95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
             100   105   110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
         115   120   125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130   135   140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145   150   155   160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
             165   170   175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
         180   185   190
Ile Val Thr Ala Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
    195   200   205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210   215   220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225   230   235   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
             245   250   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
         260   265   270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
         275   280   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290   295   300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305   310   315   320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
             325   330   335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
             340   345   350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
         355   360   365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370   375   380

Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385   390   395

<210> 487
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 197 420 GCG GCC

<400> 487
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1   5   10   15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20   25   30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35   40   45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50   55   60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65   70   75   80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85   90   95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100   105   110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115   120   125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130   135   140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145   150   155   160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165   170   175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180   185   190
Leu Thr His Val Ala Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195   200   205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210   215   220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225   230   235   240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245   250   255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260   265   270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275   280   285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290   295   300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305   310   315   320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325   330   335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340   345   350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355   360   365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370   375   380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385   390   395   400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405   410   415
Ile Val Thr Ala Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        420   425   430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe

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```
                    435                   440                   445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                   455                   460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                   470                   475                   480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                   490                   495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                   505                   510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                   520                   525
Arg Leu Ala Arg Gly His Ser Leu
    530                   535
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<210> 488
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 197 420 GCG GCC

<400> 488
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Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ala Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Leu Ala Arg Gly His Ser Leu
305                 310
```

<210> 489
<211> 621
<212> PRT

<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 334 428 499 GCG GCT GCC

<400> 489
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Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1               5                  10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
            35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
            115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
            195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
            275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Ala Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ala Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
```

```
                  485                    490                    495
Pro Ser Ala Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
              500                    505                    510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
              515                    520                    525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
              530                    535                    540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545               550                    555                    560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                  565                    570                    575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
              580                    585                    590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
              595                    600                    605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
610               615                    620
```

<210> 490
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 334 428 499 GCG GCT GCC

<400> 490
```
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                     10                    15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                    25                    30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            35                    40                    45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        50                    55                    60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                    70                    75                    80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                    90                    95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Ala Pro Ala
            100                   105                   110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                   120                   125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                   135                   140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                   150                   155                   160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                   170                   175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                   185                   190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ala Asp Gly Asn Ser
        195                   200                   205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                   215                   220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                   230                   235                   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                   250                   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                   265                   270
Pro Ser Ala Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                   280                   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                   295                   300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                   310                   315                   320
```

```
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325             330                         335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                340             345                 350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
                355             360                 365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        370             375                 380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                 390                 395
```

<210> 491
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 334 428 499 GCG GCT GCC

<400> 491
```
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
  1             5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
                20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
                35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
        50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
                100             105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
            115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
        130             135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
                180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
            195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
        210             215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
                260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
            275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
        290             295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305             310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Ala Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
```

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```
          370                       375                        380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                     390                    395                   400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                    410                    415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ala Asp Gly Asn Ser
            420                    425                    430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                    440                    445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                    455                    460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                    470                    475                   480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485  '                  490                    495
Pro Ser Ala Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                    505                    510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                    520                    525
Arg Leu Ala Arg Gly His Ser Leu
    530                    535


<210> 492
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 334 428 499 GCG GCT GCC

<400> 492
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1                5                    10                   15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                    25                   30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                    40                   45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50             .     55                   60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                    70                   75                   80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                   90                   95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Ala Pro Ala
            100                   105                  110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                   120                  125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                   135                  140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                   150                  155                  160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                  170                  175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                  185                  190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ala Asp Gly Asn Ser
        195                  200                  205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                   215                  220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                   230                  235                  240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                  250                  255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                  265                  270
Pro Ser Ala Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                   280                  285
```

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```
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290             295             300
Arg Leu Ala Arg Gly His Ser Leu
305             310


<210> 493
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 197 414 GCG GCT

<400> 493
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5               10              15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
        20              25              30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35              40              45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50              55              60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65              70              75              80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
            85              90              95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
        100             105             110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115             120             125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130             135             140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145             150             155             160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165             170             175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
        180             185             190
Leu Thr His Val Ala Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
    195             200             205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210             215             220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225             230             235             240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245             250             255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        260             265             270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    275             280             285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290             295             300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305             310             315             320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325             330             335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        340             345             350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355             360             365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370             375             380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385             390             395             400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Ala Pro Val
            405             410             415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
```

```
                    420                   425                   430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                   440                   445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
        450                   455                   460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                   470                   475                   480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                   490                   495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                   505                   510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                   520                   525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
        530                   535                   540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                   550                   555                   560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565                   570                   575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                   585                   590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
            595                   600                   605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610                   615                   620


<210> 494
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 197 414 GCG GCT

<400> 494
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Ala Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
```

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```
Glu His Glu Phe Tyr Val Lys Lys Gly Ala Lys Lys Arg Pro Ala
            260               265               270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275               280               285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        290               295               300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305               310               315                       320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325               330               335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340               345               350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
        355               360               365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
370               375               380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385               390               395
```

<210> 495
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 197 414 GCG GCT

<400> 495
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Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5               10                      15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20               25               30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35               40               45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50               55               60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65               70               75               80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
            85               90               95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100              105              110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115              120              125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130              135              140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145              150              155              160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165              170              175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180              185              190
Leu Thr His Val Ala Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195              200              205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210              215              220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225              230              235              240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245              250              255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        260              265              270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    275              280              285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290              295              300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
```

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```
305                    310                        315                        320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325             330                    335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370             375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385             390                 395                     400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Ala Pro Val
            405                 410                     415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465             470                 475                     480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485                 490                     495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
    530                 535


<210> 496
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 197 414 GCG GCT

<400> 496
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
            85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Ala Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
    195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
```

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```
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
        260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Leu Ala Arg Gly His Ser Leu
305                 310
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<210> 497
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 30 54 127 GCG GCC GCT

<400> 497
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Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Ala Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Ala Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Ala Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
        130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
        180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
    195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
```

```
            355                    360                    365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                    375                    380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                    390                    395                    400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                   405                    410                    415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                   420                    425                    430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
           435                    440                    445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                    455                    460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                    470                    475                    480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
               485                    490                    495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
           500                    505                    510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
           515                    520                    525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                    535                    540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                    550                    555                    560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
               565                    570                    575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
           580                    585                    590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
           595                    600                    605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
610                    615                    620


<210> 498
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 30 54 127 GCG GCC GCT

<400> 498
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                    10                   15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Ala Ala Glu
           20                   25                   30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
           35                   40                   45
Glu Gln Ala Pro Leu Ala Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                   55                   60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                   70                   75                   80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
               85                   90                   95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
           100                  105                  110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Ala Leu
    115                  120                  125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                  135                  140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                  150                  155                  160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
           165                  170                  175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
           180                  185                  190
```

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```
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200             205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215             220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230             235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245             250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        260             265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    275             280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290             295             300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305             310             315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325             330             335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        340             345             350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    355             360             365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370             375             380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385             390             395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405             410             415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        420             425             430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435             440             445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
450             455             460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465             470             475             480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485             490             495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        500             505             510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    515             520             525
Arg Leu Ala Arg Gly His Ser Leu
    530             535


<210> 499
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 29 260 GCG GCG

<400> 499
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1           5               10              15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Ala Val Ala Glu
        20              25              30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35              40              45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50              55              60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65              70              75              80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
            85              90              95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
```

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```
                    100                      105                      110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
            115                      120                      125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
        130                      135                      140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                      150                      155                      160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                      170                      175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                      185                      190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
            195                      200                      205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
        210                      215                      220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                      230                      235                      240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                      250                      255
Ser Asn Ser Ala Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                      265                      270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
            275                      280                      285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
        290                      295                      300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                      310                      315                      320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                      330                      335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                      345                      350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                      360                      365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
        370                      375                      380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                      390                      395                      400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                      410                      415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                      425                      430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                      440                      445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
        450                      455                      460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                      470                      475                      480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                      490                      495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                      505                      510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                      520                      525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
        530                      535                      540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                      550                      555                      560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565                      570                      575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                      585                      590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        595                      600                      605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
        610                      615                      620

<210> 500
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<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 29 260 GCG GCG

<400> 500
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1   5   10   15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20   25   30
Ser Asn Ser Ala Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35   40   45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50   55   60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65   70   75   80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85   90   95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100   105   110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115   120   125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130   135   140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145   150   155   160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165   170   175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180   185   190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195   200   205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        210   215   220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225   230   235   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245   250   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                260   265   270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            275   280   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        290   295   300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305   310   315   320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325   330   335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                340   345   350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
        355   360   365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370   375   380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385   390   395

. <210> 501
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 29 260 GCG GCG

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<400> 501

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Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Ala Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
    115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
    195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Ala Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                     525
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```
Arg Leu Ala Arg Gly His Ser Leu
    530                 535


<210> 502
<211> 312
<212> PRT
<213> Artificial Sequence


<220>
<223> Mutant rep protein: rep40 29 260 GCG GCG


<400> 502.
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
 1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Ala Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Leu Ala Arg Gly His Ser Leu
305                 310


<210> 503
<211> 621
<212> PRT
<213> Artificial Sequence


<220>
<223> Mutant rep protein: rep78 4 484 GCT GCC


<400> 503
Thr Ala Gly Ala Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
```

```
          35                    40                    45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
     50                    55                    60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                    70                    75                    80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
               85                    90                    95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
              100                   105                   110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
              115                   120                   125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
         130                   135                   140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                   150                   155                   160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
              165                   170                   175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
              180                   185                   190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
              195                   200                   205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
         210                   215                   220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                   230                   235                   240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
              245                   250                   255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
         260                   265                   270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
         275                   280                   285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
         290                   295                   300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                   310                   315                   320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
              325                   330                   335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
              340                   345                   350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
              355                   360                   365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
         370                   375                   380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                   390                   395                   400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
              405                   410                   415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
              420                   425                   430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
         435                   440                   445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                   455                   460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                   470                   475                   480
Glu His Glu Ala Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
              485                   490                   495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
         500                   505                   510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
         515                   520                   525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                   535                   540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                   550                   555                   560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
              565                   570                   575
```

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```
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                 585                 590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        595                 600                 605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610                 615                 620
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<210> 504
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 4 484 GCT GCC

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<400> 504
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
  1               5                  10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
Glu His Glu Ala Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                 310                 315                 320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325                 330                 335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340                 345                 350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
        355                 360                 365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370                 375                 380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                 390                 395
```

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<210> 505
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 4 484 GCT GCC

<400> 505
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Thr Ala Gly Ala Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
            85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
```

```
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465             470             475                         480
Glu His Glu Ala Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500             505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
    530                 535
```

<210> 506
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 4 484 GCT GCC

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<400> 506
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5               10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
    195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245                 250                 255
Glu His Glu Ala Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Leu Ala Arg Gly His Ser Leu
305                 310
```

<210> 507
<211> 621
<212> PRT
<213> Artificial Sequence

<220>

<223> Mutant rep protein: rep78 258 124 132 GCC GCC GCC

<400> 507
```
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5               10              15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
        20              25              30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35              40              45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50              55              60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65              70              75              80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
            85              90              95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
        100             105             110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ala Glu Pro Thr Leu
        115             120             125
Pro Asn Trp Ala Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130             135             140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145             150             155             160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
        165             170             175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
        180             185             190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
    195             200             205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210             215             220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225             230             235             240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245             250             255
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        260             265             270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275             280             285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290             295             300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305             310             315             320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325             330             335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        340             345             350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355             360             365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
370             375             380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385             390             395             400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405             410             415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        420             425             430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435             440             445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450             455             460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465             470             475             480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485             490             495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        500             505             510
```

```
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515             520             525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
        530             535             540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545             550             555             560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            565             570             575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580             585             590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        595             600             605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
        610             615             620
```

<210> 508
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 258 124 132 GCC GCC GCC

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<400> 508
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5               10              15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20              25              30
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35              40              45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        50              55              60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65              70              75              80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
            85              90              95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
        100             105             110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115             120             125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        130             135             140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145             150             155             160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165             170             175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
        180             185             190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195             200             205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        210             215             220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225             230             235             240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245             250             255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
        260             265             270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275             280             285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        290             295             300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305             310             315             320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
            325             330             335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
```

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```
                  340                    345                    350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
          355                    360                    365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
      370                    375                    380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                    390                    395
```

```
<210> 509
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 258 124 132 GCC GCC GCC

<400> 509
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
  1               5                    10                    15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
          20                    25                    30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
          35                    40                    45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
      50                    55                    60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                    70                    75                    80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
              85                    90                    95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
          100                    105                    110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ala Glu Pro Thr Leu
          115                    120                    125
Pro Asn Trp Ala Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
      130                    135                    140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                    150                    155                    160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
              165                    170                    175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
          180                    185                    190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
          195                    200                    205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
      210                    215                    220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                    230                    235                    240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
              245                    250                    255
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
          260                    265                    270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
          275                    280                    285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
      290                    295                    300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                    310                    315                    320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
              325                    330                    335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
          340                    345                    350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
          355                    360                    365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
      370                    375                    380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                    390                    395                    400
```

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```
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
    530                 535
```

<210> 510
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 258 124 132 GCC GCC GCC

<400> 510
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Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
  1           5                 10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
            85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Leu Ala Arg Gly His Ser Leu
```

<210> 511
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 231 497 GCC GCC

<400> 511
```
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
                180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
                260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                 440                 445
```

```
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Ala Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                 535                 540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                 550                 555                 560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565                 570                 575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                 585                 590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    595                 600                 605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610                 615                 620


<210> 512
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 231 497 GCC GCC

<400> 512
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Ala Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
```

```
                275                    280                    285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                    295                    300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                    310                    315                    320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325                    330                    335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                340                    345                    350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
                355                    360                    365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370                    375                    380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                    390                    395
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<210> 513
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 231 497 GCC GCC

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<400> 513
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                    10                     15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
        20                     25                     30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                     40                     45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                     55                     60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                     70                     75                     80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                     90                     95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                    105                    110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                    120                    125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                    135                    140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                    150                    155                    160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                    170                    175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                    185                    190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                    200                    205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                    215                    220
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
225                    230                    235                    240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                    250                    255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                    265                    270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
            275                    280                    285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                    295                    300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                    310                    315                    320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                    330                    335
```

```
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Ala Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
    530                 535


<210> 514
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 231 497 GCC GCC

<400> 514
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
```

Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                    260   265   270
Ala Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
                    275   280   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
          290   295   300
Arg Leu Ala Arg Gly His Ser Leu
305   310

<210> 515
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 221 258 GCA GCC

<400> 515
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
  1   5   10   15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
               20   25   30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
          35   40   45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
     50   55   60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65   70   75   80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                    85   90   95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
               100   105   110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
          115   120   125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
     130   135   140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145   150   155   160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                    165   170   175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
               180   185   190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
          195   200   205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ala Ala Arg Tyr
     210   215   220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225   230   235   240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                    245   250   255
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
               260   265   270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
          275   280   285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
     290   295   300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305   310   315   320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                    325   330   335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
          340   345   350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
          355   360   365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
     370   375   380

```
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            515                 520                 525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                 535                 540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                 550                 555                 560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            565                 570                 575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                 585                 590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    595                 600                 605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610                 615                 620

<210> 516
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 221 258 GCA GCC

<400> 516
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
 1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
            85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
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```
        210                    215                    220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                    230                    235                    240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                    250                    255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                    265                    270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                    280                    285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                    295                    300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                    310                    315                    320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325                    330                    335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340                    345                    350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
        355                    360                    365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        370                    375                    380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                    390                    395


<210> 517
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 221 258 GCA GCC

<400> 517
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
  1             5                    10                    15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                    25                    30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                    40                    45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                    55                    60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                    70                    75                    80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                    90                    95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                    105                    110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                    120                    125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
        130                    135                    140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                    150                    155                    160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                    170                    175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                    185                    190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                    200                    205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ala Ala Arg Tyr
    210                    215                    220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                    230                    235                    240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                    250                    255
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                    265                    270
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```
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                     320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
                340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                     400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                     480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
                500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
    530                 535


<210> 518
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 221 258 GCA GCC

<400> 518
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1                   5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                      80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                     160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
```

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```
                    180                      185                      190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
         195                      200                      205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
         210                      215                      220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                      230                      235                      240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                    245                      250                      255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                    260                      265                      270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
         275                      280                      285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
         290                      295                      300
Arg Leu Ala Arg Gly His Ser Leu
305                      310
```

```
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
  1                5                      10                      15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
         20                      25                      30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
         35                      40                      45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
         50                      55                      60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                      70                      75                      80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                    85                      90                      95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
                    100                     105                     110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
                    115                     120                     125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
         130                     135                     140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                     150                     155                     160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                    165                     170                     175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
                    180                     185                     190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
                    195                     200                     205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
         210                     215                     220
Met Glu Leu Val Gly Trp Leu Val Asp Ala Gly Ile Thr Ser Glu Lys
225                     230                     235                     240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                    245                     250                     255
Ser Asn Ser Arg Ser Gln Ile Ala Ala Ala Leu Asp Asn Ala Gly Lys
                    260                     265                     270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
         275                     280                     285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
         290                     295                     300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                     310                     315                     320
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```
Thr Lys Lys Phe Gly Ala Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
              325             330             335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
              340             345             350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
              355             360             365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370             375             380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385             390             395             400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
              405             410             415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
              420             425             430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
              435             440             445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450             455             460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465             470             475             480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
              485             490             495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
              500             505             510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
              515             520             525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530             535             540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545             550             555             560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
              565             570             575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
              580             585             590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    595             600             605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610             615             620

<210> 520
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 234 264 326 GCG GCG GCC

<400> 520
Met Glu Leu Val Gly Trp Leu Val Asp Ala Gly Ile Thr Ser Glu Lys
1             5             10             15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
              20             25             30
Ser Asn Ser Arg Ser Gln Ile Ala Ala Ala Leu Asp Asn Ala Gly Lys
              35             40             45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50             55             60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65             70             75             80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
              85             90             95
Thr Lys Lys Phe Gly Ala Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
              100            105            110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
              115            120            125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130             135             140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
```

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```
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                 310                 315                 320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325                 330                 335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340                 345                 350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
        355                 360                 365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370                 375                 380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                 390                 395

<210> 521
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 234 264 326 GCG GCG GCC

<400> 521
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
```

```
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Ala Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Ala Ala Ala Leu Asp Asn Ala Gly Lys
        260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Ala Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
    530                 535
```

<210> 522
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 234 264 326 GCG GCG GCC

<400> 522
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Met Glu Leu Val Gly Trp Leu Val Asp Ala Gly Ile Thr Ser Glu Lys
 1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Ala Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Ala Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
```

```
                115                    120                    125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        130                    135                    140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                    150                    155                    160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                    170                    175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                    185                    190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                    200                    205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        210                    215                    220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                    230                    235                    240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245                    250                    255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
        260                    265                    270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                    280                    285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                    295                    300
Arg Leu Ala Arg Gly His Ser Leu
305                    310


<210> 523
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 153 398 AGC GCG

<400> 523
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                    10                     15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                     25                     30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                     40                     45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                     55                     60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                     70                     75                     80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                     90                     95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                    105                    110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                    120                    125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                    135                    140
Asn Lys Val Val Asp Glu Cys Tyr Ser Pro Asn Tyr Leu Leu Pro Lys
145                    150                    155                    160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                    170                    175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                    185                    190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                    200                    205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                    215                    220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                    230                    235                    240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245                    250                    255


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```
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
            275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
            290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Ala Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            515                 520                 525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                 535                 540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                 550                 555                 560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565                 570                 575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                 585                 590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    595                 600                 605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
610                 615                 620
```

<210> 524
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 153 398 AGC GCG

<400> 524

```
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
```

```
                        85                    90                      95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        130             135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145             150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Ala Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        210             215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225             230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        290             295                 300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305             310                 315                 320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325                 330                 335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340             345                 350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            355                 360                 365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        370             375                 380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                 390                 395
```

<210> 525
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 153 398 AGC GCG

<400> 525

```
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
        50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
        130             135                 140
```

```
Asn Lys Val Val Asp Glu Cys Tyr Ser Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
                180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
            195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Ala Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
    530                 535
```

<210> 526
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 153 398 AGC GCG

<400> 526
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Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
 1               5                  10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
```

```
        50                      55                      60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                      70                      75                      80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                    85                      90                      95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                100                     105                     110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
                115                     120                     125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        130                     135                     140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                     150                     155                     160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Ala Val Arg
                165                     170                     175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                180                     185                     190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                195                     200                     205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        210                     215                     220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                     230                     235                     240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                     250                     255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
        260                     265                     270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                     280                     285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        290                     295                     300
Arg Leu Ala Arg Gly His Ser Leu
305                     310
```

<210> 527
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 53 216 GCG GCC

```
<400> 527
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1               5                      10                      15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
                20                      25                      30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
                35                      40                      45
Glu Gln Ala Pro Ala Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
        50                      55                      60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                      70                      75                      80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                      90                      95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
                100                     105                     110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                     120                     125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
        130                     135                     140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                     150                     155                     160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                     170                     175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
                180                     185                     190
```

```
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ala Arg Ser Lys Thr Ser Ala Arg Tyr
        210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                     240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245                 250                     255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
        290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                     320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
        370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                     400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405                 410                     415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
        450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                     480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
        530                 535                 540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                 550                 555                     560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565                 570                     575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                 585                 590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        595                 600                 605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
610                 615                 620

<210> 528
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 53 216 GCG GCC

<400> 528
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
```

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```
                  20                25                30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
            35                40                45
Glu Gln Ala Pro Ala Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
        50                55                60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                70                75                80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                90                95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100               105               110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115               120               125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
        130               135               140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145               150               155               160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165               170               175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180               185               190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
            195               200               205
Pro Asn Ser Asp Ala Pro Val Ala Arg Ser Lys Thr Ser Ala Arg Tyr
        210               215               220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225               230               235               240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245               250               255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        260               265               270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275               280               285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
        290               295               300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305               310               315               320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325               330               335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        340               345               350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355               360               365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
370               375               380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385               390               395               400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405               410               415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        420               425               430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435               440               445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
        450               455               460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465               470               475               480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485               490               495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        500               505               510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515               520               525
Arg Leu Ala Arg Gly His Ser Leu
        530               535
```

<210> 529

```
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ala Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
            85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Ala Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
```

```
465                     470                      475                       480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                      490                      495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                      505                      510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                      520                      525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                      535                      540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                      550                      555                      560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565                      570                      575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                      585                      590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        595                      600                      605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610                      615                      620

<210> 530
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 22 382 GCT GCG

<400> 530
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                       10                      15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                      25                      30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                      40                      45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                      55                      60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                      70                      75                      80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                      90                      95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                     105                     110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                     120                     125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                     135                     140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Ala Thr Ala
145                     150                     155                     160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                     170                     175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                     185                     190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                     200                     205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                     215                     220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                     230                     235                     240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                     250                     255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                     265                     270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                     280                     285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                     295                     300
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```
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305             310             315                 320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
            325             330                 335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340             345                 350
Ser Gln Pro Val Ser Val Val Lys Ala Tyr Gln Lys Leu Cys Tyr
        355             360             365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370             375             380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385             390             395
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<210> 531
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 22 382 GCT GCG

<400> 531
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Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1           5               10                  15
Glu His Leu Pro Gly Ala Ser Asp Ser Phe Val Asn Trp Val Ala Glu
        20              25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35              40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50              55              60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65              70              75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85              90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100             105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115             120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130             135             140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145             150             155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165             170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180             185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195             200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210             215             220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225             230             235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245             250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260             265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275             280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290             295             300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305             310             315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325             330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        340             345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
```

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```
                355                   360                     365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Ala Thr Ala
        370                   375                     380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                   390                   395                     400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                   410                     415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                420                   425                     430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                   440                   445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                   455                   460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                   470                   475                     480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                   490                   495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
                500                   505                   510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                   520                   525
Arg Leu Ala Arg Gly His Ser Leu
    530                   535


<210> 532
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 22 382 GCT GCG

<400> 532
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
  1               5                   10                      15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                   25                      30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                   40                      45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                   55                   60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                   70                   75                      80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                   90                      95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                   105                     110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                   120                     125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                   135                     140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Ala Thr Ala
145                   150                   155                     160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165                   170                     175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
        180                   185                     190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                   200                     205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                   215                     220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                   230                     235                   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                   250                     255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                   265                     270
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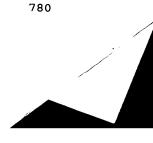
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Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
    275                     280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                     295                 300
Arg Leu Ala Arg Gly His Ser Leu
305                     310


<210> 533
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 231 411 GCC GCA

<400> 533
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ala Asp Pro Thr Pro Val


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                      405                      410                      415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
              420                      425                      430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
              435                      440                      445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
          450                      455                      460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                      470                      475                      480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                  485                      490                      495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
              500                      505                      510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
          515                      520                      525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
          530                      535                      540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                      550                      555                      560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                  565                      570                      575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
              580                      585                      590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
          595                      600                      605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
          610                      615                      620

<210> 534
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 231 411 GCC GCA

<400> 534
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
  1               5                      10                      15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
              20                      25                      30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
          35                      40                      45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
      50                      55                      60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                      70                      75                      80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                  85                      90                      95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
              100                     105                     110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
          115                     120                     125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
          130                     135                     140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                     150                     155                     160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                  165                     170                     175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ala Asp Pro Thr Pro Val
              180                     185                     190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
          195                     200                     205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
      210                     215                     220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                     230                     235                     240
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```
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            290                 295                 300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                 310                 315                 320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
            325                 330                 335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340                 345                 350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            355                 360                 365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
            370                 375                 380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                 390                 395


<210> 535
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 231 411 GCC GCA

<400> 535
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
            35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
            50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
            115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
            130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
            195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
            210                 215                 220
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
            275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
```

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```
                290                    295                    300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                    310                    315                    320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                    330                    335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
                340                    345                    350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
                355                    360                    365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
                370                    375                    380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                    390                    395                    400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ala Asp Pro Thr Pro Val
                405                    410                    415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                420                    425                    430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
                435                    440                    445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
                450                    455                    460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                    470                    475                    480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                    490                    495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
                500                    505                    510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
                515                    520                    525
Arg Leu Ala Arg Gly His Ser Leu
                530                    535


<210> 536
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 231 411 GCC GCA

<400> 536
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
1                   5                    10                    15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                20                    25                    30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
                35                    40                    45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
                50                    55                    60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                    70                    75                    80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                    90                    95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                100                   105                   110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
                115                   120                   125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
                130                   135                   140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                   150                   155                   160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                   170                   175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ala Asp Pro Thr Pro Val
                180                   185                   190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                195                   200                   205
```

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```
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
                275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Leu Ala Arg Gly His Ser Leu
305                 310
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```
<210> 537
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 59 305 GCG GCC

<400> 537
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
  1             5                 10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
                20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
                35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Ala Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
                100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
                115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
                180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
    195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
                260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
                275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Ala Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
```

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                    340                         345                         350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                         360                         365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
        370                         375                         380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                         390                         395                     400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                    405                         410                         415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                420                         425                         430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                         440                         445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
        450                         455                         460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                         470                         475                     480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                    485                         490                         495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
                500                         505                         510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            515                         520                         525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
        530                         535                         540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                         550                         555                     560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                    565                         570                         575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
                580                         585                         590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
            595                         600                         605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
        610                         615                         620
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<210> 538
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 59 305 GCG GCC

<400> 538
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Ala Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
```

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Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                     185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                 310                 315                 320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325                 330                 335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340                 345                 350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
        355                 360                 365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370                 375                 380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                 390                 395

<210> 539
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 59 305 GCG GCC

<400> 539
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1           5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Ala Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
```

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                    230                        235                    240
225
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                        250                    255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                        265                    270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
            275                        280                    285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
        290                        295                    300
Ala Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                        310                    315                    320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                        330                    335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                        345                    350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                        360                    365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
        370                        375                    380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                        390                    395                    400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                        410                    415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                        425                    430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                        440                    445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
        450                        455                    460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                        470                    475                    480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                        490                    495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                        505                    510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            515                        520                    525
Arg Leu Ala Arg Gly His Ser Leu
            530                        535


<210> 540
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 59 305 GCG GCC

<400> 540
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
 1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                      25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                      40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                      55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                      70                  75                  80
Ala Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                     105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                     120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                     135                 140
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Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
        260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Leu Ala Arg Gly His Ser Leu
305                 310


<210> 541
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 53 231 GCG GCC

<400> 541
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1               5                  10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
        20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Ala Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
            85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
        100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
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                275                      280                      285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
        290                      295                      300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                      310                      315                      320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                      330                      335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
                340                      345                      350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
                355                      360                      365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
        370                      375                      380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                      390                      395                      400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                      410                      415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                420                      425                      430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
                435                      440                      445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
        450                      455                      460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                      470                      475                      480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                      490                      495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        500                      505                      510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                      520                      525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
        530                      535                      540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                      550                      555                      560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565                      570                      575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
        580                      585                      590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        595                      600                      605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
610                      615                      620


<210> 542
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 53 231 GCG GCC

<400> 542
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                       10                      15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                20                      25                      30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                      40                      45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        50                      55                      60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                      70                      75                      80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                      90                      95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                100                     105                     110
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Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115             120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        130             135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145             150             155                         160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165             170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180             185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195             200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        210             215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225             230             235                         240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245             250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260             265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            275             280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        290             295                 300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305             310             315                         320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325             330                 335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340             345                 350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            355             360                 365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        370             375                 380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385             390                 395
```

<210> 543
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 53 231 GCG GCC

```
<400> 543
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1               5                   10              15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20              25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35              40                  45
Glu Gln Ala Pro Ala Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50              55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65              70                  75                      80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85              90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100             105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115             120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
        130             135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145             150                 155                     160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
```

```
                     165                      170                      175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
             180                      185                      190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
         195                      200                      205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
     210                      215                      220
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
225                      230                      235                      240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                 245                      250                      255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
             260                      265                      270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
         275                      280                      285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
     290                      295                      300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                      310                      315                      320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                 325                      330                      335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
             340                      345                      350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
         355                      360                      365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
     370                      375                      380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                      390                      395                      400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                 405                      410                      415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
             420                      425                      430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
         435                      440                      445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
     450                      455                      460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                      470                      475                      480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                 485                      490                      495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
             500                      505                      510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
         515                      520                      525
Arg Leu Ala Arg Gly His Ser Leu
     530                      535


<210> 544
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 53 231 GCG GCC

<400> 544
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
             20                      25                      30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
         35                      40                      45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
     50                      55                      60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                      70                      75                      80
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```
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                 85                  90              95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105             110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115             120             125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        130             135             140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145             150             155             160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165             170             175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180             185             190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195             200             205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        210             215             220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225             230             235             240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245             250             255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260             265             270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            275             280             285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290             295             300
Arg Leu Ala Arg Gly His Ser Leu
305             310

<210> 545
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 258 498 GCC GCT

<400> 545
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
  1           5               10              15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20              25              30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35              40              45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50              55              60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65              70              75              80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
            85              90              95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
        100             105             110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115             120             125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130             135             140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145             150             155             160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165             170             175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180             185             190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195             200             205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
```

```
          210                     215                     220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                     230                     235                     240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                     250                     255
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                     265                     270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                     280                     285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                     295                     300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                     310                     315                     320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                     330                     335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                     345                     350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                     360                     365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                     375                     380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                     390                     395                     400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                     410                     415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                     425                     430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                     440                     445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                     455                     460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                     470                     475                     480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                     490                     495
Pro Ala Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                     505                     510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                     520                     525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                     535                     540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                     550                     555                     560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565                     570                     575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                     585                     590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        595                     600                     605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610                     615                     620
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<210> 546
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep proteinrep 52 258 498 GCC GCT

<400> 546
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Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1               5                   10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35                  40                  45
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Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
        260                 265                 270
Pro Ala Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
    275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305                 310                 315                 320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
            325                 330                 335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
        340                 345                 350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
    355                 360                 365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370                 375                 380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385                 390                 395
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<210> 547
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 258 498 GCC GCT

<400> 547
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1               5                  10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
```

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```
                    100                     105                     110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
            115                     120                     125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
        130                     135                     140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                     150                     155                     160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                    165                     170                     175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                     185                     190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                     200                     205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                     215                     220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                     230                     235                     240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                    245                     250                     255
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                     265                     270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                     280                     285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                     295                     300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                     310                     315                     320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                    325                     330                     335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                     345                     350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                     360                     365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                     375                     380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                     390                     395                     400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                    405                     410                     415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                     425                     430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                     440                     445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                     455                     460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                     470                     475                     480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                    485                     490                     495
Pro Ala Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                     505                     510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                     520                     525
Arg Leu Ala Arg Gly His Ser Leu
    530                     535
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<210> 548
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 258 498 GCC GCT

<400> 548
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Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
 1               5                   10                      15
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Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20                  25                  30
Ser Ala Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260                 265                 270
Pro Ala Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290                 295                 300
Arg Leu Ala Arg Gly His Ser Leu
305                 310
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<210> 549
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 88 231 GCC GCC

<400> 549
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Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1           5                  10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Ala Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
```

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145             150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
            195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
            275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            515                 520                 525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                 535                 540
Phe Pro Cys Arg·Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                 550                 555                 560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            565                 570                 575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                 585                 590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    595                 600                 605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
610                 615                 620
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<210> 550
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 88 231 GCC GCC

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<400> 550
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
1   5   10   15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20   25   30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35   40   45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50   55   60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65   70   75   80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
            85   90   95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100   105   110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115   120   125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130   135   140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145   150   155   160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165   170   175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180   185   190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195   200   205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210   215   220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225   230   235   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245   250   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260   265   270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
    275   280   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290   295   300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305   310   315   320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
            325   330   335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340   345   350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
    355   360   365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370   375   380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385   390   395

<210> 551
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 88 231 GCC GCC

<400> 551
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1   5   10   15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20   25   30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35   40   45

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Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Ala Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
                100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
        130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
                180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
        210                 215                 220
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
                260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
                275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
        290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
        370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
        450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        500                 505                 510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Leu Ala Arg Gly His Ser Leu
        530                 535
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<210> 552
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 88 231 GCC GCC

<400> 552
Met Glu Leu Val Gly Trp Ala Val Asp Lys Gly Ile Thr Ser Glu Lys
1   5   10   15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20   25   30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35   40   45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50   55   60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65   70   75   80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85   90   95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100   105   110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115   120   125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130   135   140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145   150   155   160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165   170   175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180   185   190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195   200   205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        210   215   220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225   230   235   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245   250   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260   265   270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275   280   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290   295   300
Arg Leu Ala Arg Gly His Ser Leu
305   310

<210> 553
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 101 363 GCA GCC

<400> 553
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
1   5   10   15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20   25   30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35   40   45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50   55   60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65   70   75   80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85   90   95
Thr Thr Gly Val Ala Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile

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                    100                      105                      110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                      120                      125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                      135                      140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                      150                      155                      160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                    165                      170                      175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                      185                      190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                      200                      205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                      215                      220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                      230                      235                      240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                    245                      250                      255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                      265                      270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                      280                      285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                      295                      300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                      310                      315                      320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                    325                      330                      335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                      345                      350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Ala Phe Pro Phe Asn Asp
        355                      360                      365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                      375                      380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                      390                      395                      400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                    405                      410                      415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                      425                      430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                      440                      445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                      455                      460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                      470                      475                      480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                    485                      490                      495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                      505                      510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                      520                      525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
    530                      535                      540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                      550                      555                      560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                    565                      570                      575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                      585                      590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
        595                      600                      605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610                      615                      620

<210> 554
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<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 101 363 GCA GCC

<400> 554
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1   5   10   15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
        20   25   30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        35   40   45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50   55   60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65   70   75   80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85   90   95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100   105   110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
        115   120   125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Ala Phe Pro Phe Asn Asp
    130   135   140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145   150   155   160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165   170   175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180   185   190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
        195   200   205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210   215   220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225   230   235   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245   250   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260   265   270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
        275   280   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290   295   300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305   310   315   320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325   330   335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340   345   350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
        355   360   365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
    370   375   380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385   390   395

<210> 555
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 101 363 GCA GCC

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<400> 555
Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
 1   5   10   15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20   25   30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35   40   45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50   55   60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65   70   75   80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
            85   90   95
Thr Thr Gly Val Ala Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100   105   110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
    115   120   125
Pro Asn Trp Phe Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130   135   140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145   150   155   160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
            165   170   175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
        180   185   190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
    195   200   205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210   215   220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225   230   235   240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            245   250   255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
        260   265   270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    275   280   285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290   295   300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305   310   315   320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            325   330   335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340   345   350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Ala Phe Pro Phe Asn Asp
        355   360   365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
370   375   380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385   390   395   400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            405   410   415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420   425   430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    435   440   445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450   455   460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465   470   475   480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485   490   495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
         500   505   510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    515   520   525

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Arg Leu Ala Arg Gly His Ser Leu
    530                 535
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<210> 556
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 101 363 GCA GCC

<400> 556
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Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
  1               5                  10                  15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
             20                  25                  30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
         35                  40                  45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
     50                  55                  60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
 65                  70                  75                  80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
             85                  90                  95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100                 105                 110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            115                 120                 125
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Ala Phe Pro Phe Asn Asp
            130                 135                 140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145                 150                 155                 160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165                 170                 175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180                 185                 190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            195                 200                 205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            210                 215                 220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225                 230                 235                 240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245                 250                 255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                260                 265                 270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            275                 280                 285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            290                 295                 300
Arg Leu Ala Arg Gly His Ser Leu
305                 310
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<210> 557
<211> 621
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep78 354 132 GCC GCC

<400> 557
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Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
  1               5                  10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
             20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
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                35                      40                      45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                      55                      60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                      70                      75                      80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                      90                      95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
                100                     105                     110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
                115                     120                     125
Pro Asn Trp Ala Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
                130                     135                     140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                     150                     155                     160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                     170                     175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
                180                     185                     190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
                195                     200                     205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
                210                     215                     220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                     230                     235                     240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                     250                     255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
                260                     265                     270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
                275                     280                     285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
                290                     295                     300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                     310                     315                     320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                     330                     335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
                340                     345                     350
Phe Ala Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
                355                     360                     365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
370                     375                     380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                     390                     395                     400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                     410                     415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                420                     425                     430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
                435                     440                     445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
                450                     455                     460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                     470                     475                     480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                     490                     495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
                500                     505                     510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
                515                     520                     525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
                530                     535                     540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                     550                     555                     560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565                     570                     575
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Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580   585   590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
            595   600   605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
            610   615   620

<210> 558
<211> 397
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep52 354 132 GCC GCC

<400> 558
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1   5   10   15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20   25   30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            35   40   45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
            50   55   60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65   70   75   80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
                85   90   95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100   105   110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            115   120   125
Phe Ala Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            130   135   140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145   150   155   160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
                165   170   175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180   185   190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            195   200   205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            210   215   220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225   230   235   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
                245   250   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260   265   270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            275   280   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            290   295   300
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
305   310   315   320
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
                325   330   335
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
            340   345   350
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            355   360   365
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
            370   375   380
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
385   390   395

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<210> 559
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 354 132 GCC GCC

<400> 559
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Thr Ala Gly Phe Tyr Glu Ile Val Ile Lys Val Pro Ser Asp Leu Asp
  1               5                  10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
             20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
         35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
     50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                 85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
             100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
         115                 120                 125
Pro Asn Trp Ala Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
             180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
         195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
             260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
         275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
             340                 345                 350
Phe Ala Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
         355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
             420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
         435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
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Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465   470   475   480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            485   490   495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500   505   510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
            515   520   525
Arg Leu Ala Arg Gly His Ser Leu
    530   535

<210> 560
<211> 312
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep40 354 132 GCC GCC

<400> 560
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
1   5   10   15
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
            20   25   30
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            35   40   45
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
    50   55   60
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
65   70   75   80
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
            85   90   95
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
            100   105   110
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            115   120   125
Phe Ala Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
    130   135   140
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
145   150   155   160
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
            165   170   175
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
            180   185   190
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
    195   200   205
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
    210   215   220
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
225   230   235   240
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
            245   250   255
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
            260   265   270
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            275   280   285
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
    290   295   300
Arg Leu Ala Arg Gly His Ser Leu
305   310

<210> 561
<211> 621
<212> PRT
<213> Artificial Sequence

<220>

<223> Mutant rep protein: rep78 10 132 GCG GCC

<400> 561

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Thr Ala Gly Phe Tyr Glu Ile Val Ile Ala Val Pro Ser Asp Leu Asp
1               5                   10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
        35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
    50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Ala Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
        195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
        275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
            340                 345                 350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
        355                 360                 365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
    370                 375                 380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                 390                 395                 400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                 410                 415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
            420                 425                 430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
        435                 440                 445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
    450                 455                 460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                 470                 475                 480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                 490                 495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                 505                 510
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Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                 520                 525
Arg Tyr Gln Asn Lys Cys Ser Arg His Val Gly Met Asn Leu Met Leu
        530                 535                 540
Phe Pro Cys Arg Gln Cys Glu Arg Met Asn Gln Asn Ser Asn Ile Cys
545                 550                 555                 560
Phe Thr His Gly Gln Lys Asp Cys Leu Glu Cys Phe Pro Val Ser Glu
                565                 570                 575
Ser Gln Pro Val Ser Val Val Lys Lys Ala Tyr Gln Lys Leu Cys Tyr
            580                 585                 590
Ile His His Ile Met Gly Lys Val Pro Asp Ala Cys Thr Ala Cys Asp
            595                 600                 605
Leu Val Asn Val Asp Leu Asp Asp Cys Ile Phe Glu Gln
    610                 615                 620


<210> 562
<211> 536
<212> PRT
<213> Artificial Sequence

<220>
<223> Mutant rep protein: rep68 10 132 GCG GCC

<400> 562
Thr Ala Gly Phe Tyr Glu Ile Val Ile Ala Val Pro Ser Asp Leu Asp
  1           5                  10                  15
Glu His Leu Pro Gly Ile Ser Asp Ser Phe Val Asn Trp Val Ala Glu
            20                  25                  30
Lys Glu Trp Glu Leu Pro Pro Asp Ser Asp Met Asp Leu Asn Leu Ile
            35                  40                  45
Glu Gln Ala Pro Leu Thr Val Ala Glu Lys Leu Gln Arg Asp Phe Leu
        50                  55                  60
Thr Glu Trp Arg Arg Val Ser Lys Ala Pro Glu Ala Leu Phe Phe Val
65                  70                  75                  80
Gln Phe Glu Lys Gly Glu Ser Tyr Phe His Met His Val Leu Val Glu
                85                  90                  95
Thr Thr Gly Val Lys Ser Met Val Leu Gly Arg Phe Leu Ser Gln Ile
            100                 105                 110
Arg Glu Lys Leu Ile Gln Arg Ile Tyr Arg Gly Ile Glu Pro Thr Leu
        115                 120                 125
Pro Asn Trp Ala Ala Val Thr Lys Thr Arg Asn Gly Ala Gly Gly Gly
    130                 135                 140
Asn Lys Val Val Asp Glu Cys Tyr Ile Pro Asn Tyr Leu Leu Pro Lys
145                 150                 155                 160
Thr Gln Pro Glu Leu Gln Trp Ala Trp Thr Asn Met Glu Gln Tyr Leu
                165                 170                 175
Ser Ala Cys Leu Asn Leu Thr Glu Arg Lys Arg Leu Val Ala Gln His
            180                 185                 190
Leu Thr His Val Ser Gln Thr Gln Glu Gln Asn Lys Glu Asn Gln Asn
            195                 200                 205
Pro Asn Ser Asp Ala Pro Val Ile Arg Ser Lys Thr Ser Ala Arg Tyr
    210                 215                 220
Met Glu Leu Val Gly Trp Leu Val Asp Lys Gly Ile Thr Ser Glu Lys
225                 230                 235                 240
Gln Trp Ile Gln Glu Asp Gln Ala Ser Tyr Ile Ser Phe Asn Ala Ala
                245                 250                 255
Ser Asn Ser Arg Ser Gln Ile Lys Ala Ala Leu Asp Asn Ala Gly Lys
            260                 265                 270
Ile Met Ser Leu Thr Lys Thr Ala Pro Asp Tyr Leu Val Gly Gln Gln
            275                 280                 285
Pro Val Glu Asp Ile Ser Ser Asn Arg Ile Tyr Lys Ile Leu Glu Leu
    290                 295                 300
Asn Gly Tyr Asp Pro Gln Tyr Ala Ala Ser Val Phe Leu Gly Trp Ala
305                 310                 315                 320
Thr Lys Lys Phe Gly Lys Arg Asn Thr Ile Trp Leu Phe Gly Pro Ala
                325                 330                 335
Thr Thr Gly Lys Thr Asn Ile Ala Glu Ala Ile Ala His Thr Val Pro
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                340                      345                      350
Phe Tyr Gly Cys Val Asn Trp Thr Asn Glu Asn Phe Pro Phe Asn Asp
            355                      360                      365
Cys Val Asp Lys Met Val Ile Trp Trp Glu Glu Gly Lys Met Thr Ala
        370                      375                      380
Lys Val Val Glu Ser Ala Lys Ala Ile Leu Gly Gly Ser Lys Val Arg
385                      390                      395                      400
Val Asp Gln Lys Cys Lys Ser Ser Ala Gln Ile Asp Pro Thr Pro Val
                405                      410                      415
Ile Val Thr Ser Asn Thr Asn Met Cys Ala Val Ile Asp Gly Asn Ser
                420                      425                      430
Thr Thr Phe Glu His Gln Gln Pro Leu Gln Asp Arg Met Phe Lys Phe
            435                      440                      445
Glu Leu Thr Arg Arg Leu Asp His Asp Phe Gly Lys Val Thr Lys Gln
        450                      455                      460
Glu Val Lys Asp Phe Phe Arg Trp Ala Lys Asp His Val Val Glu Val
465                      470                      475                      480
Glu His Glu Phe Tyr Val Lys Lys Gly Gly Ala Lys Lys Arg Pro Ala
                485                      490                      495
Pro Ser Asp Ala Asp Ile Ser Glu Pro Lys Arg Val Arg Glu Ser Val
            500                      505                      510
Ala Gln Pro Ser Thr Ser Asp Ala Glu Ala Ser Ile Asn Tyr Ala Asp
        515                      520                      525
Arg Leu Ala Arg Gly His Ser Leu
    530                      535


<210> 563
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 4 GCT

<400> 563
acggcggggg cttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactggggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
```

<210> 564
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 10 GCG

<400> 564
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acggcggggt tttacgagat tgtgattgcg gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcaccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 565
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 20 GCC

<400> 565
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctggcc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcaccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
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tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa       1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                           1932

<210> 566
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 22 GCT

<400> 566
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc         60
ggcgcttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat        120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag        180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg        240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg        300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctcccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa       1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                          .1932

<210> 567
<211> 1932
<212> DNA
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<400> 567
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaacgcggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agacttttttc cggtgggcaa aggatcacgt ggttggaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

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<400> 568
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt ggcgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
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```
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
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<210> 569
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 39 GCA

<400> 569
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccggcagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 570
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 53 GCT

<400> 570

```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaaggcgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                         1932
```

<210> 571
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 59 GCG

<400> 571

```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaaggcgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
```

```
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 572
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 64 GCT

<400> 572
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttg ctacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 573
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 74 GCG

<400> 573
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
```

-602-

```
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932

<210> 574
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 86 GCG

<400> 574
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagcgag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
```

```
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 575
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 88 GCC

<400> 575
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcaccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag cgccttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat ctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
```

<210> 576
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 101 GCA

<400> 576
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcaccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
gcatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
```

```
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

\<210\> 577
\<211\> 1932
\<212\> DNA
\<213\> Artificial Sequence

\<220\>
\<223\> Mutant rep DNA sequence: 124 GCC

\<400\> 577
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactggggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtgccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct ttttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtac tcgtggaaac caccggggtg      300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcgggg ccgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
```

<210> 578
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 125 GCG

<400> 578
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgcgccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                       1932
```

<210> 579
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 127 GCT

<400> 579
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccggc tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
```

```
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932

<210> 580
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 132 GCC

<400> 580
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcaccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tgggccgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctcccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932

<210> 581
<211> 1932
<212> DNA
<213> Artificial Sequence
```

<220>
<223> Mutant rep DNA sequence: 140 GCC

<400> 581

```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360.
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatgcc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                        1932
```

<210> 582
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 161 GCC

<400> 582

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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
gcccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
```

```
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                         1932
```

<210> 583
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 163 GCT

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<400> 583
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgcgcgtg agtaaggccc cggaggccct tttctttgtg        240
caatttgaga agggagagag ctacttccaa atgcacgtgc tcgtggaaac caccgggtg        300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccaggctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                         1932
```

<210> 584
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 175 GCT

```
<400> 584
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
```

```
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac aggctttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga tcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932

<210> 585
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 193 GCG

<400> 585
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatgcga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
```

```
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                         1932
```

<210> 586
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 196 GCC

```
<400> 586
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgcctc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg gggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                         1932
```

<210> 587
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 197 GCC

```
<400> 587
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
```

```
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc   420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa   480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg   540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtggc ccagacgcag   600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact   660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag   720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg   780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc   840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa   900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc   960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag  1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc  1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg  1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc  1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc  1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg  1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag  1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg  1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca  1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg  1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg  1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc  1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt  1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg  1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa  1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga  1920
cactctctct ga                                                      1932

<210> 588
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 221 GCA

<400> 588
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc    60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat   120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag   180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg   240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg   300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt   360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc   420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa   480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg   540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag   600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact   660
gcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag   720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg   780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc   840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa   900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc   960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag  1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc  1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg  1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc  1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc  1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg  1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag  1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg  1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca  1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg  1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg  1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc  1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt  1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg  1800
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-612-

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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                       1932
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<210> 589
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 228 GCG

<400> 589
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggcggggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932
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<210> 590
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 231 GCC

<400> 590
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
```

```
tcagccaggt acatggagct ggtcgggtgg gccgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                        1932
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<210> 591
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 234 GCG

<400> 591
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggacg cggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                        1932
```

<210> 592

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<400> 592
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat        120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag        180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg        240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg         300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa        480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattgc ctcggagaag  .     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggag       1020
accaacatcg cggaggccat agcccacact gtgccccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa       1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                           1932
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<400> 593
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag        180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg        240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg         300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
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gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa        480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcagcc atctccttca atgcggcctc caactcgcgg        780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
```

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acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgagcag aactcaacga ccttcgaaca ccagcagccg    1320
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932


<210> 594
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 258 GCC

<400> 594
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
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gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
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aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932


<210> 595
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
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<223> Mutant rep DNA sequence: 260 GCG

<400> 595

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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcggcg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagaccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agacttttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                           1932
```

<210> 596
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 263 GCC

<400> 596

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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaagcca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
```

```
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 597
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 264 GCG

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<400> 597
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatcg cggctggcct tggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 598
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 334 GCG

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<400> 598
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
```

```
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg gggctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                        1932

<210> 599
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 335 GCT

<400> 599
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg gggctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
```

```
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 600
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 337 GCT

<400> 600
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcagc taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgt tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcgagcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat ctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
```

<210> 601
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 341 GCC

<400> 601
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
```

-620-

```
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
gccaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                          1932

<210> 602
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 342 GCC

<400> 602
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accgccatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
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caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932


<210> 603
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 347 GCA

<400> 603
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccgc agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932


<210> 604
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 350 AAT

<400> 604
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
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-622-

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cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacaat gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtt   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                      1932


<210> 605
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 350 GCT

<400> 605
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacgct gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                      1932


<210> 606
<211> 1932
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<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 354 GCC

<400> 606
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttcg ccgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagg tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
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<210> 607
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 363 GCC

<400> 607
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
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accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgaggcct ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgca    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932


<210> 608
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 364 GCT

<400> 608
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctcccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaacg ctcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932


<210> 609
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 367 GCC
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<400> 609

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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcgc cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                         1932
```

<210> 610
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence:370 GCC

<400> 610

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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgcc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
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-626-

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gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                        1932


<210> 611
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence:376 GCG

<400> 611
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg        300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatcgcgtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                        1932


<210> 612
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 381 GCG

<400> 612
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
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-627-

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caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggGtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
gcgatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
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<210> 613
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence:382 GCG

<400> 613
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggGtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aaggcgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
```

-628-

```
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
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<210> 614
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 389 GCG

<400> 614
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggaggcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
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<210> 615
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 407 GCC

<400> 615
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
```

-629-

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aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaaggc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932


<210> 616
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 411 GCA

<400> 616
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag gcagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932
```

<210> 617
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 414 GCT

<400> 617
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtcg tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccgg ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
```

<210> 618
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 420 GCT

<400> 618
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
```

```
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcgggc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcaccgct   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                      1932
```

<210> 619
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 421 GCC

<400> 619

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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctcccccaaa    480
acccagcctg agctccagtg ggcgtggcg aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
gccaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                      1932
```

<210> 620
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 422 GCC

<400> 620
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat   120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag   180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg   240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg   300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt   360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc   420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa   480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg   540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag   600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact   660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag   720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg   780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc   840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa   900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc   960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag  1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc  1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg  1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc  1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc  1260
aacgccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg  1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag  1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg  1440
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg  1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg  1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc  1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt  1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg  1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa  1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga  1920
cactctctct ga                                                     1932
```

<210> 621
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 424 GCG

<400> 621
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat   120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag   180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg   240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg   300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt   360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc   420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa   480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg   540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag   600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact   660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag   720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg   780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc   840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa   900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc   960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag  1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc  1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg  1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc  1200
```

-633-

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gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaacg cgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 622
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 428 GCT

<400> 622
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc    60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat   120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag   180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggcccct tttctttgtg   240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtcgaaac caccggggtg   300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt   360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc   420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa   480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg   540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag   600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact   660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag   720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg   780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc   840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa   900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc   960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt ggctgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                        1932
```

<210> 623
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence:429 GCC

<400> 623
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc    60
```

```
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg gcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgccggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt ggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
```

<210> 624
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 438 GCG

<400> 624
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg gcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca cgcgcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
```

```
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                         1932


<210> 625
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 440 GCG

<400> 625
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcaggcg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932


<210> 626
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 451 GCC

<400> 626
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
```

```
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttccctycaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc gcccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt ggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                      1932
```

<210> 627
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 460 GCG

<400> 627
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttccctycaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttggggcg   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
```

```
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 628
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 462 GCC

<400> 628
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt gggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcgccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
```

<210> 629
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 462 ATA

<400> 629
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
```

-638-

```
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcataaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa       1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                          1932
```

<210> 630
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 484 GCC

<400> 630
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat        120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag        180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg        240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg        300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa        480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaag cctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa       1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                          1932
```

<210> 631

<400> 631
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagg tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                       1932
```

<400> 632
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
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taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcág atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
```

```
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 633
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 497 GCC

<400> 633
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
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aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
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gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
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gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
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<210> 634
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>

<400> 634
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cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg         240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg        300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa        480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccg aagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa       1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                          1932
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<210> 635
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 497 CTC

<400> 635
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat         120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag         180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg         240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg        300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa        480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
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-642-

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aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgccct cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgca    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932

<210> 636
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 497 TAC

<400> 636
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgccta cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                        1932

<210> 637
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 498 GCT

<400> 637
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cgctgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                        1932
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<210> 638
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence:499 GCC

<400> 638
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cgctgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
```

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gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 639
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 503 GCG

<400> 639
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatatagcgg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
```

<210> 640
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 510 GCA

<400> 640
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
```

-645-

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gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
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gatataagtg agcccaaacg ggtgcgcgca tcagttgcgc agccatcgac gtcagacgcg   1560
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932
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<210> 641
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 511 GCA

<400> 641
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcaacg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag gcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
```

```
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                       1932

<210> 642
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 512 GCT

<400> 642
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg   300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaaccgcc   840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagctgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932

<210> 643
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 516 GCG

<400> 643
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg   300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
```

-647-

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cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccagcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932


<210> 644
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 517 GCT

<400> 644
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcga gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct ttttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcggc ttcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932


<210> 645
<211> 1932
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<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 517 AAC

<400> 645
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccggggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat ctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgaa ctcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                          1932
```

<210> 646
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 518 GCA

<400> 646
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga.gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattc ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
```

-649-

```
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac ggcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                         1932
```

<210> 647
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 519 GCG

<400> 647
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
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acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagcggcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                         1932
```

<210> 648
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 598 GCA

<400> 648

```
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat         120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag         180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg         240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg        300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa        480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat ggcaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt ggatgactg catctttgaa        1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                           1932
```

<210> 649
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 600 GCG

<400> 649

```
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat         120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag         180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg         240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg        300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa        480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
```

-651-

```
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggcg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                       1932
```

<210> 650
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 601 GCA

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<400> 650
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc. cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctcccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
gcagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                       1932
```

<210> 651
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 335 420 495 GCT GCC GCC

```
<400> 651
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
```

```
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg gggctgcaac taccggggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
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aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 652
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 39 140 GCA GCC

<400> 652
```
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatgcc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
```

```
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 653
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 279 428 451 GCC GCT GCC

<400> 653
```
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaagccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt ggctgacggg aactcaacga ccttcgaaca ccagcagccg   1320
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ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932
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<210> 654
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 125 237 600 GCG GCC GCG

<400> 654
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgcgccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
```

-654-

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aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag          600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact          660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattgc ctcggagaag          720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg          780
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg         1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc         1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc         1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg         1320
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gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg         1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca         1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg         1560
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc         1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt         1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggcg         1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa         1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga         1920
cactctctct ga                                                            1932

<210> 655
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 163 259 GCT GCG

<400> 655
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag          180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg          240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg          300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt          360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc          420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa          480
acccaggctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg          540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag          600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact          660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattgc ctcggagaag          720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caacgcgcgg          780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa          900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc          960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag         1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc         1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg         1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc         1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc         1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg         1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag         1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg         1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca         1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg         1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg         1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc         1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt         1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg         1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa         1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga         1920
cactctctct ga                                                            1932
```

-655-

<210> 656
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 17 127 189 GCG GCT GCG

<400> 656
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccggc tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggcggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcgcctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
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<210> 657
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 350 428 GCT GCT

<400> 657
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
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aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
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attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacgct gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt ggctgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                      1932
```

<210> 658
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 54 338 495 GCC GCC GCC

<400> 658
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tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
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taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
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cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                      1932
```

<210> 659
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 350 420 GCT GCC

<400> 659
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caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg   300
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gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa   480
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gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact   660
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aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg  1320
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa  1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga  1920
cactctctct ga                                                       1932
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<210> 660
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 189 197 518 GCG GCG GCA

<400> 660
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cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg   240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg   300
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gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa   480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg   540
aatctcacgg agcgtaaacg gttggcggcg cagcatctga cgcacgtggc gcagacgcag   600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact   660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag   720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg   780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc   840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa   900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc   960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag  1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc  1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg  1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc  1200
```

-658-

```
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac ggcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 661
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 468 516 GCC GCG

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<400> 661
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggactg ggtcgggtgg ctcgtgacca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agccttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccagcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 662
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 127 221 350 54 140 GCT
      GCA GCT GCC GCC

<400> 662

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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccggc tttgccaaac tggttcgcgg tcacaaagac cagaaatgcc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
gcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacgct gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                       1932
```

<210> 663
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 221 285   GCA GCG

<400> 663

```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
gcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggcgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
```

<center>-660-</center>

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gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 664
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 23 495 GCT GCC

<400> 664
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcattgctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gagccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
```

<210> 665
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 20 54 420 495 GCC GCC GCC
      GCC

<400> 665
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctggcc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
```

```
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acggggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg gaggaggggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcaccgcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gagccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932


<210> 666
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 412 612 GCC GCG

<400> 666
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acggggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg gaggaggggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagccccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
```

```
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgcggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 667
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 197 412 GCG GCC

```
<400> 667
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtggc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagccccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 668
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 412 495 511 GCC GCC GCA

```
<400> 668
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
```

```
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca agggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagccccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gagccgcccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag gcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa       1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                          1932

<210> 669
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 98 422 GCC GCC

<400> 669
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc         60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat        120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag        180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg        240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac cgccgggggtg        300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa        480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca agggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagccccga ctcccgtgat cgtcacctcc       1260
aacgccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa       1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                          1932
```

-664-

<210> 670
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 17 127 189 GCG GCT GCG

<400> 670
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacgc gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccggc tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggcggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccggggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg gggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 671
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 20 54 495 GCC GCC GCC

<400> 671
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctggcc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
```

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```
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc   960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag  1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc  1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg  1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc  1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc  1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg  1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag  1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg  1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gagccgcccc cagtgacgca  1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg  1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg  1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc  1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt  1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg  1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa  1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga  1920
cactctctct ga                                                     1932

<210> 672
<211> 1932
<212> DNA  ·
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 54 163 GCC GCT

<400> 672
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc   60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat  120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag  180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg  240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg  300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt  360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc  420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa  480
acccaggctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg  540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag  600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact  660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag  720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg  780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc  840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa  900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc  960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag  1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc  1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg  1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc  1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc  1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg  1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag  1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg  1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca  1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg  1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg  1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc  1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt  1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg  1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa  1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga  1920
cactctctct ga                                                     1932

<210> 673
<211> 1932
<212> DNA
<213> Artificial Sequence
```

<220>
<223> Mutant rep DNA sequence: 259 54 GCG GCC

<400> 673
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatcgcg cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caacgcgcgg       780
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gtggaccaga aatgcaagtc ctcggccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                           1932
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<210> 674
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 335 399 GCT GCG

<400> 674
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatcgcg cggtgatcag atcaaaaact       660
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attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggcgcgc      1200
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-667-

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gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
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ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                       1932
```

<210> 675
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 221 432 GCA GCA

<400> 675
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcga atcaaaaact     660
gcagccaggt acatggagct ggtcgggtgg ctcgtggaca agggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
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aacaccaaca tgtgcgccgt gattgacggg aacgcaacga ccttcgaaca ccagcagccg    1320
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                       1932
```

<210> 676
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 259 516 GCG GCG

<400> 676
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat        120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag        180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg        240
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taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa        480
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gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caacgcgcgg        780
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
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gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gaccccgccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccagcgac gtcagacgcg       1560
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ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa       1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                          1932

<210> 677
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 495 516 GCC GCG

<400> 677
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag        180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg        240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg         300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa        480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caacgcgcgg        780
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
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gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gagccgcccc cagtgacgca       1500
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccagcgac gtcagacgcg      1560
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                         1932
```

<210> 678
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 414 14 GCT GCC

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<400> 678
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caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatcctatg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
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caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                         1932
```

<210> 679
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 74 402 495 GCG GCC GCC

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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccg cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
```

-670-

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taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   `1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932

<210> 680
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 228 462 497 GCC GCC GCC

<400> 680
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggccgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcgccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgccgc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560.
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932


<210> 681
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 290 338 GCG GCC

<400> 681
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggacgt ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgcg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac tgccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt gggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932


<210> 682
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 140 511 GCC GCA

<400> 682
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatgcc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
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tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag gcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                        1932


<210> 683
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 86 378 GCG GCG

<400> 683
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagcgag ctacttccac atgcacgtgc tcgtggaaac caccgggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggcggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                        1932


<210> 684
```

-673-

<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 54 86 GCC GCG

<400> 684
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagcgag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccggggag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acggggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                         1932
```

<210> 685
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 214 495 140 GCG GCC GCC

<400> 685
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcaccccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
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taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatgcc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
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aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgg cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
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acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 686
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 495 511 GCC GCA

<400> 686
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
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gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gagccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag gcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 687
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>

<400> 687

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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat         120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag         180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg         240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg          300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt         360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc         420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa         480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg         540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag         600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact         660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag         720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg         780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc         840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa         900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc         960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag        1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc        1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg        1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc        1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc        1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg        1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag        1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg        1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gagccgcccc cagtgacgca        1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg        1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg        1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc        1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt        1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg        1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa        1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga        1920
cactctctct ga                                                            1932
```

<210> 688
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>

<400> 688

```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc          60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat         120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag         180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg         240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg          300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt         360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc         420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa         480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg         540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag         600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact         660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag         720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg         780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc         840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa         900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc         960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag        1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc        1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg        1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc        1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc        1260
```

```
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gagccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgca      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 689
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 261 20 GCC GCC

<400> 689
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctggcc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct ttttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
gcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 690
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 54 20 GCC GCC

<400> 690
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctggcc ·      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
```

```
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat·cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gag·catgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932


<210> 691
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 197 420 GCG GCC

<400> 691
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtggc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcaccgcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
```

-678-

```
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                         1932


<210> 692
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 54 338 495 GCC GCC GCC

<400> 692
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac tgccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
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gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gagccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                        1932


<210> 693
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 197 427 GCG GCG

<400> 693
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
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gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtggc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgc gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
```

<210> 694
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 54 228 370 387 GCC GCC
     GCC GCG

<400> 694
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggccgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
```

-680-
```

```
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 695
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 221 289 GCA GCC

<400> 695
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
gcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaaccgcc     840
cccgactacc tggtgggcca gcaggccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agacttttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 696
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 54 163 GCC GCT

<400> 696
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccaggctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
```

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tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcgaac gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                        1932

<210> 697
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 341 407 420 GCC GCC GCC

<400> 697
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggcta ccgtctttct gggatggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
gccaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaaggc ctcggcccag atagacccga ctcccgtgat cgtcaccgcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
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gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                        1932

<210> 698
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<210> 698
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 54 228 GCC GCC

<400> 698
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
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aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggccgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
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gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 699
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 96 125 511 GCA GCG GCA

<400> 699
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggcgtg caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
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gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
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gatataagtg agcccaaacg ggtgcgcgag gcagttgcgc agccatcgac gtcagacgcg      1560
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932


<210> 700
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 197 420 GCG GCC

<400> 700
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggagtg      300
aaatccatgg tttgtgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtggc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
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gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcaccgcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932

<210> 701
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
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<223> Mutant rep DNA sequence: 334 428 499 GCG GCT GCC

<400> 701

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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
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gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt ggctgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgccgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                        1932
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<210> 702
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 197 414 GCG GCT

<400> 702

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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtggc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
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acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccgg ctcccgtgat cgtcacctcc      1260
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-685-

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aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
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<210> 703
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 30 54 127 GCG GCC GCT

<400> 703
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tctgacatgg atctgaatct gattgagcag gcacccctgg ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccggc tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 704
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 29 260 GCG GCG

<400> 704
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```

-686-

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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
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caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
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caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
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<210> 705
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 29 260 GCG GCG

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cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
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gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
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gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
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acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
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gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932
```

<210> 706
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 4 484 GCT GCC

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<400> 706
acggcggggg cttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatgaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaag cctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932
```

<210> 707
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 258 124 132 GCC GCC GCC

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<400> 707
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcgggg ccgagccgac tttgccaaac tgggccgcgg tcacaaagac cagaaatggc      420
```

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```
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc cgcctcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                          1932

<210> 708
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 231 497 GCC GCC

<400> 708
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc       60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat      120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag      180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg      240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg      300
aaatccatgg tttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt      360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc      420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa      480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg      540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgccgc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
```

```
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932

<210> 709
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 221 258 GCA GCC

<400> 709
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc        60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
gcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc cgcctcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg      1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt      1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga      1920
cactctctct ga                                                          1932

<210> 710
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 234 264 326 GCG GCG GCC

<400> 710
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat       120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ctcgtggacg cggggattac ctcggagaag       720
```

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cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
tcccaaatcg cggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcgccag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa .      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                           1932

<210> 711
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 153 398 AGC GCG

<400> 711
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat        120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag        180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg        240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg        300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt        360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc        420
gccggaggcg ggaacaaggt ggtggatgag tgctacagcc ccaattactt gctccccaaa        480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg        540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact        660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag        720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg        780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc        840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa        900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc        960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag       1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc       1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg       1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag cgcggtgcgc       1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc       1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg       1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag       1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg       1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca       1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg       1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg       1620·
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc       1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt       1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg       1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa       1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga       1920
cactctctct ga                                                           1932

<210> 712
<211> 1932
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<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 53 216 GCG GCC

<400> 712
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccgcga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtggccag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932

<210> 713
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 22 382 GCT GCG

<400> 713
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
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gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
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aaggcgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
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gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932

<210> 714
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 231 411 GCC GCA

<400> 714
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag   180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg   240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg   300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt   360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc   420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa   480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg   540
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aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag gcagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
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gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
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ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932

<210> 715
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 59 305 GCG GCC
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-693-

<400> 715

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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaaggcgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
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cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
attttggaac tagccgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc       960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc      1080
aatgagaact ttccccttcaa cgactgtgtc gacaagatgg tgatctggtg gggaggagggg      1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc      1200
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aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg      1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca      1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg      1560
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc      1680
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg      1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa      1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga  .   1920
cactctctct ga                                                          1932
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<210> 716
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 53 231 GCG GCC

<400> 716

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tctgacatgg atctgaatct gattgagcag gcacccgcga ccgtggccga gaagctgcag       180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg       240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg       300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt       360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc       420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa       480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg       540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag       600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact       660
tcagccaggt acatggagct ggtcgggtgg ccgtggaca aggggattac ctcggagaag       720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg       780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc       840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa       900
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acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag      1020
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aatgagaact ttccccttcaa cgactgtgtc gacaagatgg tgatctggtg gggaggagggg      1140
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gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc      1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg      1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag      1380
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg        1560
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc        1680
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg        1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa        1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga        1920
cactctctct ga                                                            1932

<210> 717
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 258 498 GCC GCT

<400> 717
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aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag        600
gagcagaaca aagagaatca gaatcccaat tctgatcgc cggtgatcag atcaaaaact        660
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aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc        1680
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caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga        1920
cactctctct ga                                                            1932

<210> 718
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 88 231 GCC GCC

<400> 718
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tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag        180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg        240
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-695-

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caatttgaga agggagagag cgccttccac atgcacgtgc tcgtggaaac caccggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
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aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
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gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932

<210> 719
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 101 363 GCA GCC

<400> 719
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcaccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
gcatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgaggcct ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
```

```
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 720
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 354 132 GCC GCC

```
<400> 720
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tgggccgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtgaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtcttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttcg ccgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<210> 721
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> Mutant rep DNA sequence: 10 132 GCG GCC

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<400> 721
acggcggggt tttacgagat tgtgattgcg gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tgggccgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
```

-697-

```
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag      600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact      660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag      720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg      780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc      840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa      900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc      960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag     1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc     1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg     1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc     1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc     1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg     1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag     1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg     1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca     1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg     1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg     1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc     1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt     1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg     1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa     1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga     1920
cactctctct ga                                                         1932

<210> 722
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> intron 630 tgc gcg

<400> 722
gtaccaaaac aaatgttctc gtcacgtggg catgaatctg atgctgtttc cctgcagaca       60
atgcgagaga atgaatcaga attcaaatat ctgcttcact cacggacaga aagactgttt      120
agagtgcttt cccgtgtcag aatctcaacc cgtttctgtc gtcaaaaagg cgtatcagaa      180
actgtgctac attcatcata tcatgggaaa ggtgccagac gcttgcactg cctgcgatct      240
ggtcaatgtg gatttggatg actgcatctt tgaacaataa atgatttaaa tcaggtatgg      300
cgcgcgatgg ttatcttcca g                                                321

<210> 723
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> intron 630 tgc cgc

<400> 723
gtaccaaaac aaatgttctc gtcacgtggg catgaatctg atgctgtttc cctgcagaca       60
atgcgagaga atgaatcaga attcaaatat ctgcttcact cacggacaga aagactgttt      120
agagtgcttt cccgtgtcag aatctcaacc cgtttctgtc gtcaaaaagg cgtatcagaa      180
actgtgctac attcatcata tcatgggaaa ggtgccagac gcttgcactg cctgcgatct      240
ggtcaatgtg gatttggatg actgcatctt tgaacaataa atgatttaaa tcaggtatgg      300
ccgccgatgg ttatcttcca g                                                321

<210> 724
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> intron 630 tgc cct

<400> 724
gtaccaaaac aaatgttctc gtcacgtggg catgaatctg atgctgtttc cctgcagaca       60
```

```
atgcgagaga atgaatcaga attcaaatat ctgcttcact cacggacaga aagactgttt    120
agagtgcttt cccgtgtcag aatctcaacc cgtttctgtc gtcaaaaagg cgtatcagaa    180
actgtgctac attcatcata tcatgggaaa ggtgccagac gcttgcactg cctgcgatct    240
ggtcaatgtg gatttggatg actgcatctt tgaacaataa atgatttaaa tcaggtatgg    300
ccctcgatgg ttatcttcca g                                              321
```

<210> 725
<211> 321
<212> DNA
<213> Artificial Sequence

<220>
<223> intron 630 tgc tca

<400> 725
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gtaccaaaac aaatgttctc gtcacgtggg catgaatctg atgctgtttc cctgcagaca     60
atgcgagaga atgaatcaga attcaaatat ctgcttcact cacggacaga aagactgttt    120
agagtgcttt cccgtgtcag aatctcaacc cgtttctgtc gtcaaaaagg cgtatcagaa    180
actgtgctac attcatcata tcatgggaaa ggtgccagac gcttgcactg cctgcgatct    240
ggtcaatgtg gatttggatg actgcatctt tgaacaataa atgatttaaa tcaggtatgg    300
ctcacgatgg ttatcttcca g                                              321
```

<210> 726
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> mutant rep DNA sequence: 598 GAC

<400> 726
```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca gggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattc ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatccac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat ggacaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932
```

<210> 727
<211> 1932

-699-

<400> 727

```
acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
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cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
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acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
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gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gagcaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932
```

<400> 728

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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc      60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg     300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
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acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
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accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaagccg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggctgc cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932
```

<210> 729
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> mutant rep DNA sequence: 630 GCG

<400> 729
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acggcggggt tttacgagat tgtgattaag gtccccagcg accttgacga gcatctgccc     60
ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccggggtg    300
aaatccatgg tttttgggac gtttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc    840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcgagcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag   1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc   1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg   1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc   1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc   1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg   1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag   1380
gtcaccaagc aggaagtcaa agactttttc cggtgggcaa aggatcacgt ggttgaggtg   1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca   1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg   1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg   1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc   1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt   1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg   1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa   1860
caataaatga tttaaatcag gtatggcgcg cgatggttat cttccagatt ggctcgagga   1920
cactctctct ga                                                       1932
```

<210> 730
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> mutant rep DNA sequence: 630 CGC

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<400> 730
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggccgc cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                       1932

<210> 731
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> mutant rep DNA sequence: 630 TCA

<400> 731
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat     120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag     180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg     240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggtg      300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt     360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc     420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa     480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg     540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag     600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact     660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag     720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg     780
tcccaaatca aggctgcctt ggacaatgcg ggaaagatta tgagcctgac taaaaccgcc     840
cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa     900
attttggaac taaacgggta cgatccccaa tatgcggctt ccgtctttct gggatgggcc     960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttcccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
ttgcaagacc ggatgttcaa atttgaactc acccgccgtc tggatcatga ctttgggaag    1380
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-702-

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gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
aatctgatgc tgtttccctg cagacaatgc gagagaatga atcagaattc aaatatctgc    1680
ttcactcacg gacagaaaga ctgtttagag tgctttcccg tgtcagaatc tcaacccgtt    1740
tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggctca cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932


<210> 732
<211> 1932
<212> DNA
<213> Artificial Sequence

<220>
<223> mutant rep DNA sequence: 630 CCT

<400> 732
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ggcatttctg acagctttgt gaactgggtg gccgagaagg aatgggagtt gccgccagat    120
tctgacatgg atctgaatct gattgagcag gcacccctga ccgtggccga gaagctgcag    180
cgcgactttc tgacggaatg gcgccgtgtg agtaaggccc cggaggccct tttctttgtg    240
caatttgaga agggagagag ctacttccac atgcacgtgc tcgtggaaac caccgggggtg    300
aaatccatgg ttttgggacg tttcctgagt cagattcgcg aaaaactgat tcagagaatt    360
taccgcggga tcgagccgac tttgccaaac tggttcgcgg tcacaaagac cagaaatggc    420
gccggaggcg ggaacaaggt ggtggatgag tgctacatcc ccaattactt gctccccaaa    480
acccagcctg agctccagtg ggcgtggact aatatggaac agtatttaag cgcctgtttg    540
aatctcacgg agcgtaaacg gttggtggcg cagcatctga cgcacgtgtc gcagacgcag    600
gagcagaaca aagagaatca gaatcccaat tctgatgcgc cggtgatcag atcaaaaact    660
tcagccaggt acatggagct ggtcgggtgg ctcgtggaca aggggattac ctcggagaag    720
cagtggatcc aggaggacca ggcctcatac atctccttca atgcggcctc caactcgcgg    780
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cccgactacc tggtgggcca gcagcccgtg gaggacattt ccagcaatcg gatttataaa    900
attttggaac taaacggta cgatcccca a tatgcggctt ccgtctttct gggatgggcc    960
acgaaaaagt tcggcaagag gaacaccatc tggctgtttg ggcctgcaac taccgggaag    1020
accaacatcg cggaggccat agcccacact gtgcccttct acgggtgcgt aaactggacc    1080
aatgagaact ttccccttcaa cgactgtgtc gacaagatgg tgatctggtg ggaggagggg    1140
aagatgaccg ccaaggtcgt ggagtcggcc aaagccattc tcggaggaag caaggtgcgc    1200
gtggaccaga aatgcaagtc ctcggcccag atagacccga ctcccgtgat cgtcacctcc    1260
aacaccaaca tgtgcgccgt gattgacggg aactcaacga ccttcgaaca ccagcagccg    1320
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gtcaccaagc aggaagtcaa agacttttc cggtgggcaa aggatcacgt ggttgaggtg    1440
gagcatgaat tctacgtcaa aaagggtgga gccaagaaaa gacccgcccc cagtgacgca    1500
gatataagtg agcccaaacg ggtgcgcgag tcagttgcgc agccatcgac gtcagacgcg    1560
gaagcttcga tcaactacgc agacaggtac caaaacaaat gttctcgtca cgtgggcatg    1620
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tctgtcgtca aaaaggcgta tcagaaactg tgctacattc atcatatcat gggaaaggtg    1800
ccagacgctt gcactgcctg cgatctggtc aatgtggatt tggatgactg catctttgaa    1860
caataaatga tttaaatcag gtatggccct cgatggttat cttccagatt ggctcgagga    1920
cactctctct ga                                                        1932


<210> 733
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> CMV 1 primer

<400> 733
tgccaagtac gcccctat                                                    19


<210> 734
<211> 23
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<212> DNA
<213> Artificial Sequence

<220>
<223> CMV 2 primer

<400> 734
aggtcatgta ctgggcataa tgc   23

<210> 735
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> flourescence probe VIC-Tamra

<400> 735
tcaatgacgg taaatggccc gcct   24